



# **Armed Forces College of Medicine (AFCM)**

**Histology Department**



# **Hemopoiesis**

# **Leukopoiesis**

**Prof. Dr. Manal Hassan Moussa**  
**Ass. Prof. Dr. Samaa Kamar**

# Intended Learning Objectives (ILO)



**By the end of this lecture the student should be able**  
**to:**

- **Describe** the cellular changes along the series of granulopoiesis
- **Interpret** the changes in the band neutrophil and blast cells count in the different diseases.

# Lecture Plan



1. Part 1 (3 min) Introduction to granulopoiesis
2. Part 2 (40 min) steps of granulopoiesis and lymphopoiesis
3. Part 3 (3 min) Summary
4. Lecture Quiz (4 min)

# Hemopoietic stem cells



**Hemopoietic  
Stem cells  
( BM)**

**Self renewal**

**High potentiality (all the blood cell types + non-blood)**

**Progenitor  
cells  
(CFU)**

**Less self renewal**

**Less potential**

**Committed to produce specific blood cells ( = Form colonies of only one cell type)**

**Precursor  
cells  
(=Blasts)**

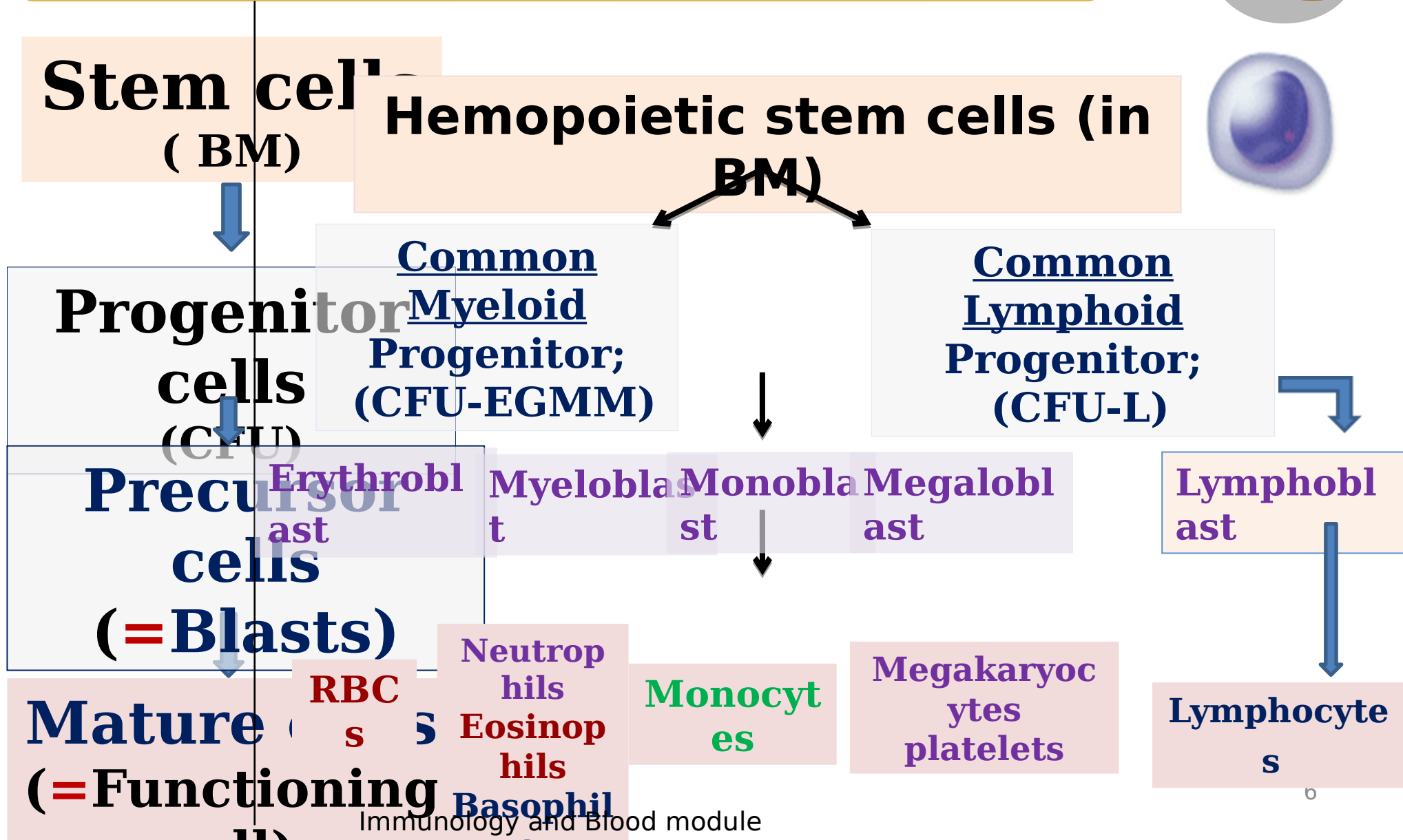
**Gradually acquire the characteristic shape of the mature cells**

**Mature cell  
(=Functioning**

Immunology and Blood module



# Hemopoietic cells



**Notice changes in:**

- **Size**
- **Nucleus**
- **Cytoplasm**

# Granulopoiesis



**Common Myeloid Progenitor (CFU-EGMM)**

## **Myeloblasts**

(**N**: large, fine chromatin, faint nucleoli)

Basophilic Cytoplasm

(No granules)

## **Promyelocytes**

(**N**: course chromatin prominent nucleoli)

Cytoplasm

Basophilic

(azurophilic

gr. appear)

## **Myelocytes**

(**N**: eccentric, coarse chromatin) (last mitosis)

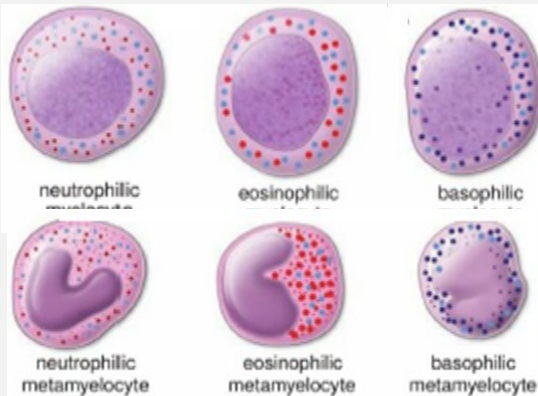
Baso-, Acido-, Neuropil C.

(Azurophilic gr. and

specific gr.)\_\_

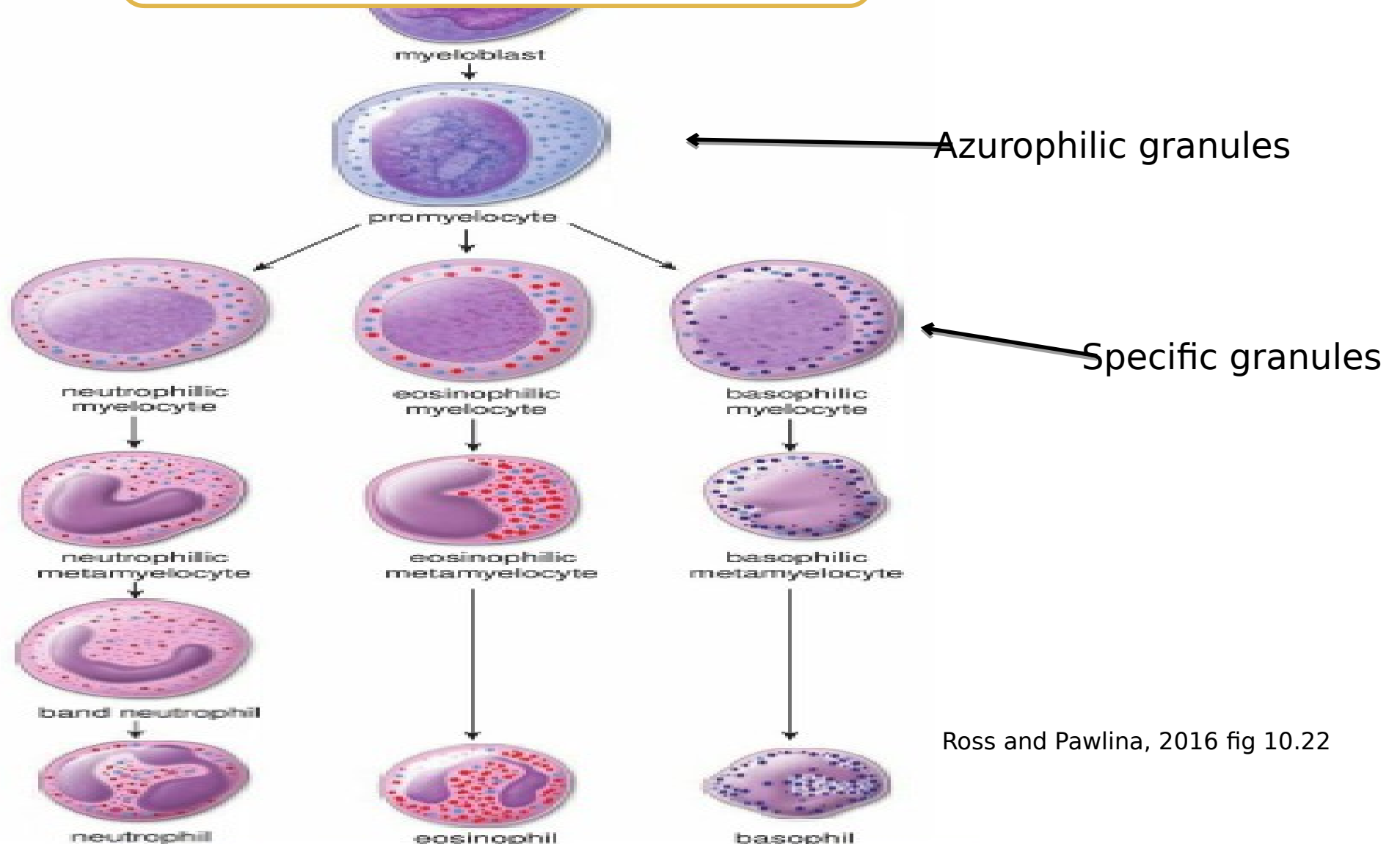
**Neutrophil, Eosinophil,  
Basophils**

Immunology and Blood module



**Band  
cell**

# Granulopoiesi s



Ross and Pawlina, 2016 fig 10.22

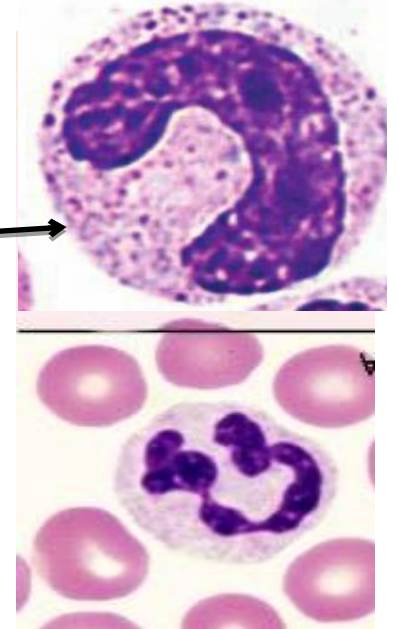


# Granulopoiesis: Band neutrophils



- Before complete maturation of neutrophils, they pass through an intermediate stage in which the **nucleus** has a **horse-shoe shape** (**band neutrophils**).

- Then the nucleus becomes **lobulated** (2-5 lobes) forming **mature neutrophils**.



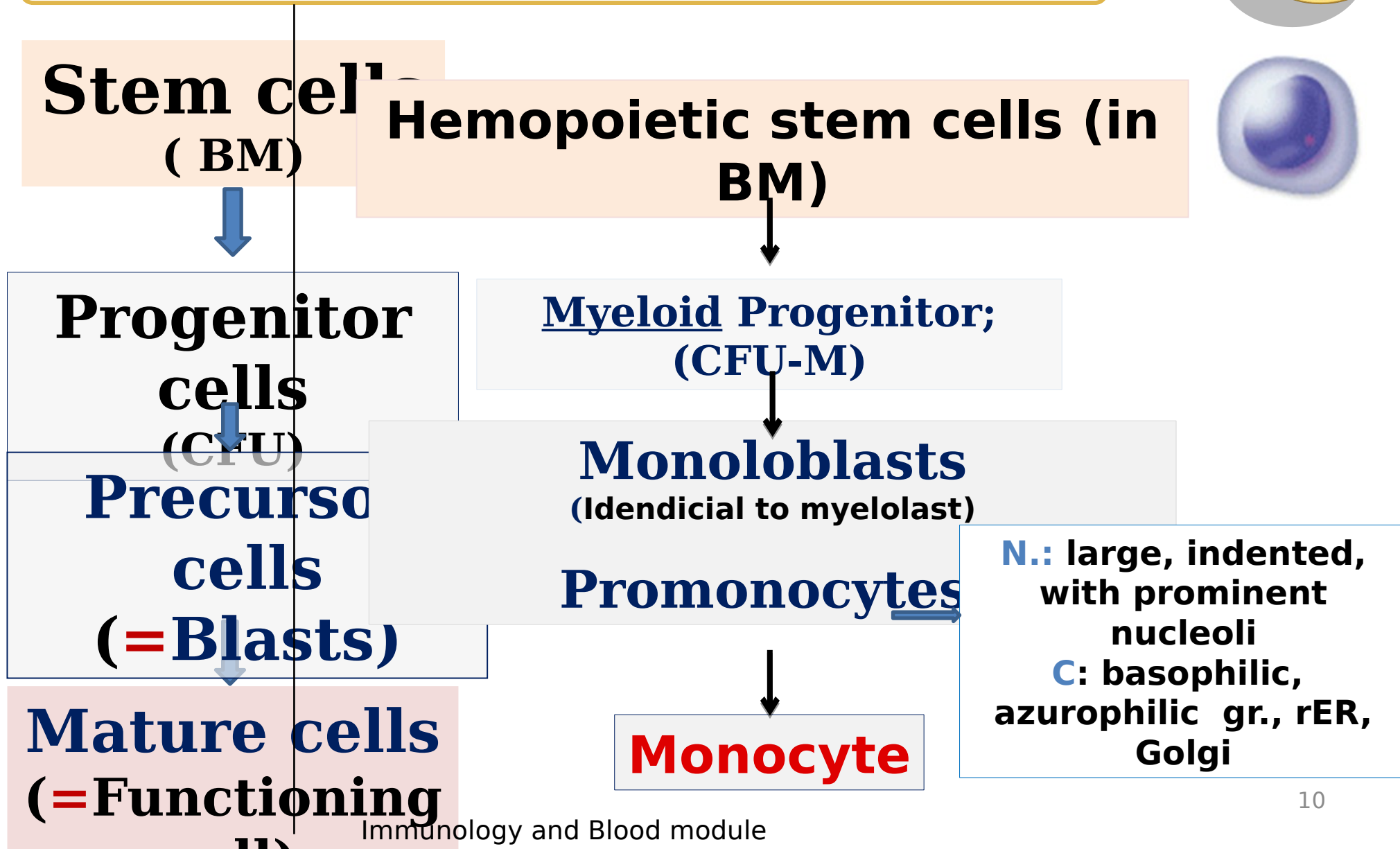
Ross and Pawlina 2016, plate 20

**High number of band neutrophils in blood**

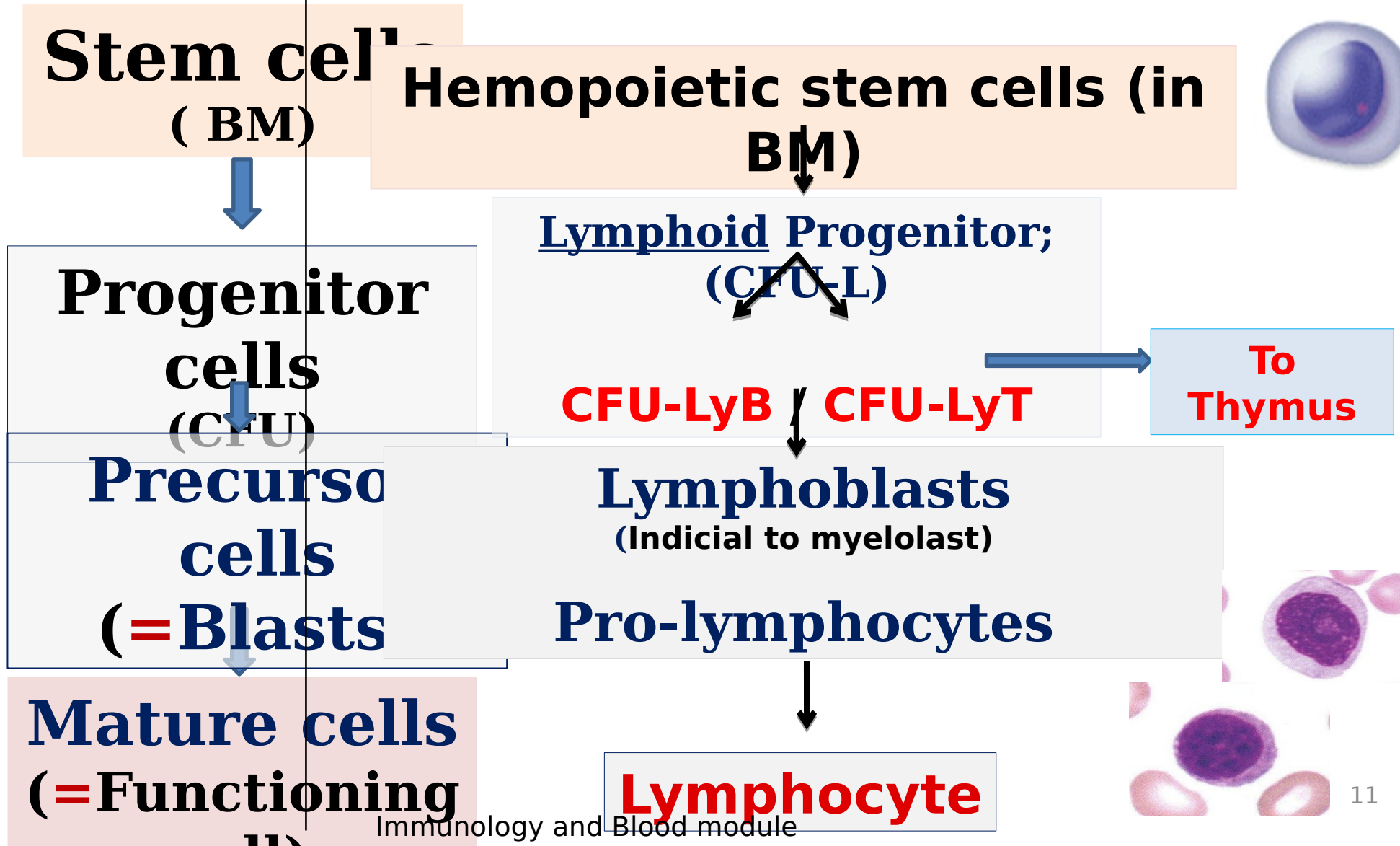
**(shift to the left)**

**indicates ongoing bacterial infection**

# Monocytopoiesis



# Lymphopoiesis



# Lecture Quiz

# Lecture Quiz



**Band neutrophils count increases in cases of -----**

**The cells with highest capacity of self renewal are -----**

**Give reasons**

- Blast cells have basophilic cytoplasm**
- Presence of 3 types of myelocytes**

## **SUGGESTED TEXTBOOKS**



- 1. Junqueira`s Basic Histology; Text and Atlas. 12<sup>th</sup> edition 2015.**
- 2. Histology A Text and Atlas: Michael H. Ross and Wojciech Pawlina, 7<sup>th</sup> edition, 2016.**



Thank  
you

